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Electrochemical determination of unithiol and lipoic acid at electrodes modified with carbon nanotubes

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Abstract

Conditions are found for the voltammetric determination of lipoic acid and unithiol at a glassy-carbon electrode modified with multiwalled carbon nanotubes. Possible mechanisms for the oxidation of lipoic acid and unithiol are proposed. As compared to an unmodified electrode, the use of the modified electrode allows the analyst to reduce overvoltage (ΔE = 0.1 V) and increase the oxidation current of lipoic acid. Unithiol is oxidized in the accessible range of potentials only at an electrode modified with carbon nanotubes. The determination limits for unithiol and lipoic acid are 4.1 × 10-5 and 1.9 × 10-5 M, respectively. Milligram amounts of these substances are determined in model solutions with RSD = 1-5%. Procedures for determining the active substances (lipoic acid and unithiol) in pharmaceuticals are proposed. © 2009 Pleiades Publishing, Ltd.

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